Policy, Research, and External Affairs

WORKING PAPERS

Trade Policy

Country Economics Department
The World Bank
June 1990
WPS 426

Growth-Oriented Adjustment Programs

A Statistical Analysis

Riccardo Faini
Jaime de Melo
Abdel Senhadji-Semlali
and
Julie Stanton

There is no statistical evidence that growth was faster — or slower — for countries that received adjustment loans. And there are no signs of sustainable recovery through higher investment — at least through 1986.

Policy, Research, and External Affairs

WORKING PAPERS

Trade Policy

WPS 426

This paper — a product of the Trade Policy Division, Country Economics Department — is part of a larger effort in PRE to analyze the sustainability of structural adjustment programs. The paper is part of the research project on trade reform in structural adjustment loans (RPO 675-32). Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Maria Ameal, room N10-031, extension 37947 (33 pages with tables).

What happened to economic performance in developing countries under growth-oriented adjustment programs sponsored by the World Bank and the IMF?

Analyzing data for a sample of 93 countries, Faini, de Melo, Senhadji-Semlali, and Stanton compared the average values of economic indicators for 1982-86 with the corresponding values for 1978-81. They controlled for the external environment and initial conditions and allowed for policies that would have been adopted if the countries had not participated in adjustment.

They found no statistical evidence of faster (or slower) growth for the countries that received loans.

They found that a higher current account surplus and lower inflation during 1978-81 were associated with better investment performance during 1982-86. And that deterioration in the external environment in 1982-86 was associated with lower growth during that period.

They also examined the investment-output relationship for 14 countries that received sizable growth-oriented adjustment loans — estimating the growth forgone because of lower aggregate investment under adjustment.

They conclude that signs of sustainable recovery through higher investment were not evident, at least through 1986. But these results are not surprising, because considerable time must pass for the benefits of structural reform to materialize.

Growth-Oriented Adjustment Programs: A Statistical Analysis

by
Riccardo Faini (Johns Hopkins University)
Jaime de Melo (The World Bank and CEPR)
Abdel Senhadji-Semlali (University of Pennsylvania)
and
Julie Stanton (University of Maryland)

Table of Contents

* We thank Bela Balassa, Ajay Chhibber, Patrick Conway, Vittorio Corbo, Peter Montiel, John Nash, and Dani Rodrik for helpful comments. Helpful comments were also received from seminars at Berkeley, Urbino, and at a conference on Adjustment Lending held at the World Bank. This paper is part of RPO 675-32.

GROWTH-ORIENTED ADJUSTMENT PROGRAMS: A STATISTICAL ANALYSIS

1. Introduction

The decade of the 1980s will be remembered as one of unfulfilled expectations for developing countries. Average per capita GDP growth fell from 3.1 percent in the 1970s to 0.6 percent in the 1980s, and for many countries, private per capita consumption growth was negative. Adjustment lending programs supported by the International Monetary Fund (IMF) and the World Bank (WB) were launched in response to the deteriorating external environment. Restoring growth has remained the focal concern of adjustment lending. Indeed, it is this greater emphasis on growth that distinguishes the adjustment programs of the 1980s from their predecessors. The purpose of this paper is to assess statistically the extent to which adjustment programs supported by the IMF and the WB have restored growth. 1/

The paper offers a fairly systematic evaluation of IMF-WB supported adjustment programs. The evaluation relies on a large sample of countries (93) and controls for some of the statistical difficulties associated with measuring the effectiveness of adjustment programs. In section 2, we review briefly the environment under which IMF-WB lending took place, the rationale for adjustment lending, and the distribution of adjustment loans through time. The methodology is described in section 3. The results of the statistical evaluation in section 4 suggest that, after controlling for external factors and for initial conditions, growth is not higher in countries recipient of IMF-WB Fund , but that investment was significantly lower than for non-recipient countries. This result leads us to examine further long-term growth prospects in section 5. There, for a

group of 15 countries that received IMF-WB adjustment loans, we estimate a simple growth model where capital is the only binding factor on output. This model allows us to measure the approximate output loss incurred during adjustment programs due to the combined reduction of private and public investment. Conclusions follow in section 6.

2. External Environment and Adjustment Lending

The proximate causes of the worsening performance of developing countries during the 1980s are well-known. For oil-importing countries, the foreclosing of commercial credit and higher real interest rates on commercial borrowing came on top of the second oil price shock. Within this group of countries, exporters of primary commodities were further adversely affected by declining prices for primary commodities as the dollar appreciated. For oil exporters, deterioration in the terms of trade came later, but they were also adversely affected by the foreclosing of commercial funds. This adverse evolution of the external environment for developing countries is summarized in the top of table 1. Using these measures, in table 2 we provide a measure of the loss in purchasing power during 1982-6 due to the unfavourable environment of the 1980s. The loss is estimated at between 3.8 and 4.5 percentage points of average GDP during 1982-6.

As can be seen from the macroeconomic indicators in table 2, as a result of the deteriorating external environment, developing countries had difficulty in improving their current account position during the eighties and they increased substantially their external indebtedness. Also, table 2 indicates that the cut in expenditures that accompanied the adjustment to

Table 1: TERMS-OF-TRADE, REAL INTEREST RATES AND BORROWING SOURCES

	1980	1981	1982	1983	1984	1985	1986
Change in Terms of Trade (%):							
Non-Fuel exporters	-5.8	-4.0	-2.0	0.6	2.6	-2.3	-2.9
Fuel exports	44.1	11.1	0.3	-8.5	0.7	-2.6	-47.9
Real interest rate a/	4.4	6.5	6.7	5.8	7.0	5.0	5.0
Borrowing sources							
Net private borrowing b/	73.3	72.5	48.9	25.4	14.8	15.7	2.3
Official borrowing (IMF and WB)							
Number of WB Adjustment loans (amount b/)	8 (0..)	8 (0.9)	5 (0.8)	22 (3.4)	10 (1.1)	18 (2.0)	28 (3.9)
Number of IMF loans (net IMF credit b/)	26 (2.3)	32 (4.7)	30 (3.8)	41 (9.4)	30 (4.4)	31 (0.9)	32 (-1.4)

Notes: a/ Percent.
b/ Billion current dollars.

Sources: World Bank (1989), table 2.1, and Khan (1988, appendix).

the more unfavourable external environment involved a reduction in the share of investment expenditures in GDP.

It is in response to these balance of payments difficulties that adjustment lending was initiated by the WB (SALs and SECALs) and that adjustment programs by the IMF (EFFs and standby arrangements) were intensified. 2/ Participation by these international agencies was intended to assist recipient countries in designing packages that would help achieve two objectives. First, the packages would help stabilize the economy by adopting measures to restore a sustainable balance between aggregate demand and aggregate supply. Second, the packages would help production in the short-run, especially in tradables because of the need to generate increased net foreign exchange earnings to meet larger debt service payments. In our companion paper (Faini, et. al. 1989), we show that this objective was met by a significantly larger real exchange rate devaluation for countries that participated in adjustment programs supported by the IMF and the World Bank. As emphasized by Corbo et al. (1987), the novel emphasis of adjustment programs in the eighties was the emphasis on restoring long-run growth, hence the label "growth-oriented" adjustment programs.

The distribution of adjustment loans (and amounts) by the IMF and by the WB are given at the bottom of table 1. The table shows the sharp drop in the availability of commercial funds starting in 1982. The table also indicates a sharp increase in lending volume and in the number of loans by both institutions starting in 1983. However, the amount of lending by both institutions far from compensated for the decline in commercial fund borrowing. While both institutions provided quick-

Table 2: MACROECONOMIC INDICATORS DURING THE 1980S

	1978-81			1982-86		
	Low Income	Middle income		Low Income	Middle Income	
GDP (Growth)	2.77	4.83		2.48	1.99	
CA/GDP	-7.97	-5.52		-7.81	-5.12	
INV/GDP	20.6	27.1		18.5	22.7	
RER	1.029	1.014		1.247	1.040	
EXSHCK/GDP a/			-4.50(LY)			-3.82 (MY)
DOD/GDP	33.8	29.3		54.2	46.6	

Definitions:

GDP = Real gross domestic product
CA = Current account
INV = Real public + private investment
RER = Real exchange rate index (1980=100). An increase in the value of RER means a real depreciation.
DOD = Public or publicly guaranteed debt m World Bank Debt tables.

Notes: Own calculations. All values are average values during the relevant period. Sample of 93 developing countries. LY = low income; MY = middle income. (Income per capita above $450 in 1986).

a/ Source: Faini et al. (1989). Estimate of the welfare loss due to lower terms of trade and higher interest rates during 1982-86 compared with 1978-81, as expressed as a share of the average GDP. Formula for the computation of the welfare loss is given below in equation 4.

disbursing loans, the shorter maturity of IMF loans implied sharply diminishing net credit after 1985.

In previous work, we found no correlation between the amount of IMF-WB adjustment credit during 1982-86 and the size of the external shock during that period, suggesting that adjustment lending was not targeted to countries facing the greatest deterioration in the external environment. However, we found a significantly negative correlation between IMF-WB credit and net private credit suggesting that IMF-WB credit served as a substitute for private credit.

3. An Implementable Model to Measure Effectiveness of IMF-WB Programs

3.1 Alternative Approaches to Evaluating Adjustment Programs

The relatively short time period since the beginning of adjustment lending is a reason why so little formal statistical evidence is available on performance under these adjustment programs. Apart from a recent paper by Khan (1988), most of the available evidence [Donovan (1982), Goldstein (1986), Cornia et al (1987), Balassa (1988)] relies on non-parametric statistics (e.g. the number of countries which show an improvement in growth in the year following implementation of an adjustment program) to assess performance. Furthermore, often the samples are small, making more difficult the interpretation of results.

Statistical evaluation of adjustment programs is fraught with difficulties. First, any assessment of performance must recognize that performance will be influenced by the external environment. Countries under adjustment programs which faced a more unfavourable environment would be expected to show less improvement in performance. Second, any assessment should, to the extent possible, take into account what policies

would have been in the absence of IMF-WB adjustment programs. Thus any "before and after" analysis should be complemented by a control group approach to reduce the bias in the estimated values of the selected indicators. These considerations are taken into account in the simple model presented below. 3/

Denote the set of performance indicators j for country i by y_{ij}. We postulate that changes in the value of each performance indicator depends on a vector of autonomous policy changes, Δx_i, on changes in the external environment, SH_i, and possibly on participation in IMF-WB adjustment programs:

$$(1) \qquad \Delta y_{ij} = \alpha_{0j} + \Delta x_i' \cdot \alpha_i + SH_i \cdot \alpha_{2j} + CON \cdot \alpha_{3j} + \epsilon_{ij}$$

where CON is a dummy variable which takes the value of 1 for countries that received an IMF and/or World Bank adjustment loan. Because autonomous policy changes are unobservable for countries participating in IMF-WB programs, we specify the following reaction function:

$$(2) \qquad \Delta x_i = \gamma \cdot [y_i^d - (y_{i-1})] + \varsigma_{ij}$$

Thus, autonomous policies are specified as an adjustment process of the performance indicators towards their desired values (y_i^d). Under the long-run assumption $(y_i = y_i^d)$, substituting $\Delta X_i'$, the transpose of (2), into (1) gives the final equation for estimation:

$$(3) \qquad \Delta y_{ij} = \beta_{0j} + (y_{i-1}') \cdot \beta_{ij} + SH_i \cdot \beta_{2j} + CON \cdot \beta_{3j} + \theta_{ij}$$

In this model, Δ refers to a difference between the "post" and "pre" adjustment periods, and in the statistical results reported in section 4, each observation is an average over the pre and post adjustment periods.

The assumption that IMF-WB lending has a fixed effect on performance may appear too restrictive. Alternatively, we introduce in equation (3) the amount of net IMF-WB lending during 1982-6 instead of the dummy variable CON. In that case, the maintained hypothesis is that, after controlling for external factors and autonomous policy changes, the change in performance is linearly related to the amount of IMF-WB disbursements.

3.2 Implementation

Since IMF-WB programs are often not initiated in the same year, it is difficult to choose the correct point for beginning the assessment of these programs. The choice of 1982 as the cut-off point was made since 1982 corresponds most closely to the year when the external environment deteriorated sharply for developing countries (see table 1). 4/

As detailed in the appendix, the sample consists of data for 93 developing countries. Among these countries, 32 did not receive any IMF-WB adjustment loans during 1982-86. Another 9 countries received their first adjustment loan only in 1985 or 1986 which makes it difficult to assess the impact of the loan given our data. Thus, these countries are added to those who did not receive adjustment loans so that the control group includes 41 countries. The remaining 52 countries received IMF-WB adjustment lending. In this group, only 2 countries received their first adjustment loan in 1984. Hence one should really interpret the statistical results as pertaining to the performance of 50 countries which received adjustment

credits in 1982 or 1983 and were carrying out policy reforms whose performance-enhancing effects were supposed to last throughout the period of analysis (i.e. until 1986). The performance of these countries is compared with the performance of 43 countries (of which 11 countries had been implementing adjustment lending policy reforms since 1984).

Next, we construct a proxy for the external environment, SH_i, by measuring terms of trade and interest rate shocks. To measure how significant the deterioration in the external environment was, we quantify the impact of the external disturbances associated with declining terms of trade and rising real interest rates. External disturbances are measured over 1982-6, taking average values over 1976-81 as the base period. The formula (country subscripts omitted) is: 5/

$$(4) \qquad SH = -(\bar{R}_2 - \bar{R}_1) \cdot (\bar{D}/\bar{Y})_1 + (\bar{PX}_2/\bar{PX}_1 - 1)(\bar{X}/\bar{Y})_1 - (\bar{PM}_2/\bar{PM}_1 - 1)(\bar{M}/\bar{Y})_1$$

where subscripts 2 and 1 refer to 1982-6, and 1976-81 respectively, a bar over a variable means an average value over the relevant period and the variables are:

$\bar{R}$ = average real interest rate (deflator is USGDP deflator) and the nominal interest rate is the weighted interest on concessional and commercial debt.

$\bar{Y}$ = real GDP

PX, PM = export and import price indices deflated by USGDP deflator

X,M = real exports and real imports

D = gross outstanding debt, net of reserves

In equation 4, the first term (RIR) measures the contribution of higher than expected interest payments and the remaining terms measure the effect of changes in the terms of trade (TOT). The choice of periods implies that the proxy for the external environment, SH_i, is expressed as a percentage of the average value of GDP during 1976-81.

4. Statistical Results

Our main interest is in the effects of adjustment programs on growth. We use two indicators of growth: GDP growth and the share of investment in GDP. It could be argued that the investment share in GDP is an intermediate target. While this would be true in the long run, our limited time-frame for the post-loan period removes this concern. An improvement in growth alone could indicate an increase in capacity utilization. Hence the investment share is used as an additional indicator of sustainable long-run growth. We also use two indicators whose developments are followed closely by the IMF: inflation and the current account. (Another closely watched indicator, the government deficit, is not included here because it is unreliable on a comparative basis.)

The results after one round of exclusion of influential observations, and correcting for heteroskedacity, appear in table 3. 6/ The effects of participation in IMF-WB programs are measured by the coefficient on the dummy CON. 7/ The first remarkable result is that participation in IMF-WB programs does not appear to affect output growth in

Table 3: PERFORMANCE UNDER ADJUSTMENT LENDING

Dependent Variable	Y_{-1}	I/Y_{-1}	CA_{-1}	$\hat{P}_{-1}$	SH	CON	F	NOBS
ΔY	-.577 (-6.32)	.006 (.17)	-.134 (-2.68)	.010 (.46)	-.069 (-2.06)	-.001 (-.19)	28.15	79
$\Delta I/Y$	.246 (1.57)	-.295 (-4.51)	.279 (2.61)	-.047 (-2.65)	-.049 (-.56)	-.006 (-.68)	10.81	80
$\Delta\hat{P}$	-.146 (-.60)	-.072 (-.70)	-.151 (-.95)	.077 (.58)	.140 (.98)	+.008 (+.43)	1.42	79
ΔCA	.395 (3.00)	.133 (3.07)	-.490 (-6.55)	.026 (1.87)	-.056 (-.84)	+.034 (+4.83)	13.60	80

The constant term is omitted from the results, and the t-statistics are in parentheses.

Definition of variables: all variables are average values over 1982-6 (e.g., y is average GDP growth during 1982-6). All lagged values are average values over 1978-81.

Y = GDP growth; I/Y = INV/GDP; CA = CA/GDP; $\hat{P}$ is the inflation rate; SH is the external shock estimate from equation 4; CON = dummy variable with value 1 if participating in IMF and/or World Bank adjustment programs; F = statistic; NOBS = number of observations used in regression.

Results are corrected for heteroskedasticity by weighing each observation by the inverse of its estimated standard error. Extreme influential observations are excluded using Belsley, Kuh, and Welsch (1980) criteria outlined in the Appendix. The list of excluded countries are given in table A.2 of the appendix.

a significant manner, after having controlled for the negative influence of external shocks. We also find that adjustment lending is positively correlated with the current account performance. These results echo those in Khan (1988) where countries that participated in Fund programs had significantly lower output growth in the first year after the inception of the program, but this negative effect appeared to diminish when Khan allowed the effects of Fund programs to last two years. Khan also found that countries participating in Fund programs had a significant improvement in their current account. The fact that we measure performance over a three to five year period (depending on when the country received its first adjustment loan) may therefore account for our finding an insignificant effect of Bank-Fund participation on growth.

The investment equation suggests that external shocks and the control group dummy are insignificant although all other variables in the equation have statistically coefficients with the expected signs. Finally, the inflation equation performed poorly. None of the explanatory variables had a significant impact on inflation. This is probably because we have not included credit in our instrument set. However, in that equation, external shocks has the right sign, i.e. external shocks push up inflation.

Our results also indicate that initial conditions play a crucial role in affecting the macroeconomic performance of the economy. For instance, it is found that a higher current account surplus and a lower inflation rate are associated with a better investment performance in the following period. It is, however, more difficult to understand why lagged inflation should have a positive effect on growth and on the current account.

To summarize, against the background of overall worsening indicators for developing countries as a whole, after controlling for external factors, IMF-WB supported adjustment programs appear not to have significantly affected output growth, nor to have affected the level or efficiency of investment. We conclude that the evidence on whether the growth-oriented adjustment programs of the eighties helped recipient countries achieve higher growth and improved efficiency is still inconclusive. Given that the structural reforms advocated by these programs often require a relatively long time period before their benefits materialize, the above results are not surprising. However, a major motivation of the adjustment programs was to mobilize resources, that is to increase the volume of investment as well as to increase its efficiency use. Therefore, in the next section we analyze further aggregate investment behavior over a long time period for a group of 15 countries which received a relatively large number of World Bank loans (usually 3 or more). In particular, we look for instability in the investment/output relationship after the inception of adjustment lending with a view to detect joint changes in capacity utilization due to stabilization and changes in the productivity of capital due to reforms. 8/ We also estimate output loss from investment cuts during adjustment.

5. Sustainability of Adjustment: Output Loss Estimates from Investment Cuts for a Group of Intensive Adjustment Lending Recipients

The previous results suggest that the foundations for sustained recovery were not achieved primarily due to the fall in investment during the adjustment lending period. We now investigate further the issue of long-term sustainability by studying aggregate investment and aggregate

output during adjustment for a group of countries which were intensive recipients of IMF-WB adjustment. 9/ We use a simple aggregate growth model in which the only binding factor on output is capital, a simplification which allows us to extend the analysis to a larger number of countries because data requirements are few, and to a period of 25 years. Labor is assumed to be in abundant supply. Foreign exchange may be scarce, but lack of its availability is, as in Taylor (1979), fully reflected in (lower) investment. As derived in the appendix, the estimated equation is:

$$(5) \qquad Q_t = (1-\lambda)\, Q_{t-1} + a\, I_t + v_t$$

where Q_t = output produced during t

λ = depreciation rate

a = output capital ratio

I_t = investment during period t

v_t = error term

This formulation eliminates the need to depend on unreliable and incomplete data on employment. It also implicitly assumes that during the estimation period, capital stock resources were fully utilized except for a stochastic term. Since this assumption is less tenable for the adjustment years, initial estimation is carried out for the pre-adjustment period. Stability testing (see table A3) is then used to assess whether the sample period can be extended up until 1986. In addition we test whether Q_{t-1} is correlated with the error term and for possible endogeneity of I_t. Details of the estimation procedure are described in the appendix.

Table 4: THE PRODUCTION FUNCTION

	$(1-\lambda)$	$\hat{a}$	D75 d/	$\bar{R}^2$	Stability (1) c/	Period of Estimation	Break Year
Chile a/ (2)	.83 (7.89)	.54 (2.34)	.35 (2.6)	.94	U	62-81	81
Colombia (2)	.89 (6.79)	.53 (.92)		1.0	S	61-85	84
Ghana (4)	.82 (7.68)	.25 (.76)		.71	S	61-85	81
Jamaica (6)	.84 (16.94)	.36 (3.13)		.94	S	61-86	80
Côte d'Ivoire (3) (fixed) b/)	.89 (20.31)	.32 (2.27)		.98	U	66-79	79
Kenya (3)	.96 (29.8)	.24 (1.66)		.99	S	66-86	81
Korea (3)	.84 (8.50)	.60 (2.48)		1.0	S	61-86	80
Malawi (4)	.94 (32.55)	.28 (2.91)		.99	U	61-80	80
Mexico (2)	.79 (8.22)	.83 (2.93)		1.0	U	62-81	81
Morocco (3)	.95 (17.53)	.29 (1.47)		.99	S	61-86	82
Pakistan (4)	.97 (26.13)	.64 (2.68)		1.0	S	61-86	79
Philippines (3)	.90 (5.90)	.45 (1.14)		1.0	U	61-79	79
Thailand (2)	.96 (54.7)	.37 (4.85)		1.0	S	61-86	81
Zambia (3)	.90 (16.94)	06 (1.09)		.92	S	61-86	83

Notes: t-statistics in parenthesis.

a/ Number of SALs and SECALs in parenthesis.

b/ For all countries, gross domestic investment was used for I_t (see equation 5) except for Côte d'Ivoire where fixed investment was used.

c/ S: stable equation (the break year is prior to the first Bank adjustment loan).
U: unstable equation.

d/ Dummy variable equal to 1 for the year 1975 and zero otherwise.

Estimation results and estimation periods appear in table 4. Column (2) gives the estimate of one minus the depreciation rate, and column (3) the inverse of the ICOR (â). With the exception of Zambia, the range of estimated values are in accordance with a priori expectations, although the average estimate for the depreciation rate (10%) is somewhat on the high side. However, our interest is primarily with the estimate of the ICOR which is around 3 (excluding outlier Zambia). For the 13 reported countries, the values of the ICOR lend themselves to be separated into 2 groups: countries with ICORs above 3 (Kenya, Ghana, Malawi, Morocco, Côte d'Ivoire) and countries with ICORs below 3 (Thailand, Philippines, Colombia, Chile, Korea, Jamaica, Mexico, Pakistan). In general, the composition of each group fits with a priori expectations.

Stability tests (reported in the appendix in table A3) indicate that 9 out of 14 equations are stable. In interpreting this result, it should be remembered that two factors are likely to affect the ICOR during the adjustment period: (1) changes in capacity utilization due to stabilization; and, (2) changes in the productivity of capital due to reforms or to a change in the public and private sector shares in investment. Because these two effects on the ICOR are indistinguishable in our model and because they are likely to move in opposite directions during adjustment, it is not surprising that stability could not be rejected in the majority of cases. Furthermore, even when the equation was found to be unstable, the fitted value of output based on the pre-adjustment estimates did not deviate much from actual output during adjustment. This suggests that the net effect on output of changes in capacity utilization and capital productivity was not significant. Therefore, instead, we shall concentrate on measuring the extent of output loss due to lower investment

during the adjustment period. This implies that we cannot evaluate, as intended, whether adjustment lending raised the marginal efficiency of investments through reforms in the system of production and investment incentives for the private sector and, for the public sector, through rationalization of public investments.

To estimate the output loss during adjustment, we estimated what output would have been, had the average investment-output ratio ($\bar{I/Q}$) between 1970 and the initiation of Bank adjustment lending prevailed afterwards. Formally, yearly output loss, L_t, is calculated as:

$$(6) \qquad L_t = \hat{a} \, [I_t - \bar{I}_t]$$

where $\bar{I}_t = (\bar{I/Q}) \cdot Q_t$, and $\hat{a}$ is the estimated value of the output/capital ratio from equation 5 (column 2 of table 4). Notice that if one believes that adjustment lending led to higher efficiency in resource use and thus to a lower incremental capital output ratio (i.e. a higher value of $\hat{a}$), then equation 6 will significantly underestimate the output loss due to the fall in investment.

Table 5 gives the estimates of the contractionary loss on output due to the lower investment levels during the period of adjustment lending. For example, Chile lost 17% of output during 1982-6 because of lower investment levels. Mexico, Chile and Malawi experienced the worst losses Of course, one cannot ascribe the entire output loss to the adjustment to a relatively more unfavorable external environment in the early eighties. Chile and Mexico, for example, had to also adjust to the disequilibria resulting from overly expansionary domestic policies in the late seventies.

Table 5: OUTPUT LOSS DUE TO LOWER INVESTMENT

Country	Adjustment Period 1/	Cumulative 2/ Effect	Average One-Year Effect	IMF-WB Adjustment Lending as % of GDP 3/
1. Chile	82-86	-.170	-.034	.010
2. Colombia	85-85	-.004	-.004	.002
3. Ghana	82-85	-.034	-.009	.025
4. Jamaica	81-86	-.118	-.020	.031
5. Côte d'Ivoire	80-86	-.049	-.007	.019
6. Kenya	82-86	-.141	-.028	.011
7. Korea	81-86	.120	.020	.003
8. Malawi	81-86	-.260	-.043	.033
9. Mexico	82-86	-.230	-.046	.004
10. Morocco	83-86	-.076	-.019	.013
11. Pakistan	80-86	-.053	-.008	.004
12. Philippines	80-86	-.097	-.014	.004
13. Thailand	82-86	-.083	-.017	.004
14. Zambia	84-86	-.037	-.012	.005

1/ The adjustment period is defined as the years after receipt of the first Bank SAL.

2/ The formula used is $\sum_{t=s}^{e} \hat{a}(I_t - \bar{I}_t)/QF_t$; $\bar{I}_t = \left(\frac{\bar{I}}{Q}\right) \cdot Q_t$

where:

$\left(\frac{\bar{I}}{Q}\right)$ is the average of the investment/output ratio from 1970 until the starting dates of the adjustment program.

I_t = the level of investments.

QF_t = the fitted value of output (e.g. 5 where I_t was replaced by $\bar{I}_t$)

s = the starting date of the adjustment program.

e = the last year available during the adjustment program.

3/ Average IMF-WB lending on average GDP over period 79-86.

Only Korea raised her investment ratio during adjustment, thereby showing a positive output gain.

Excluding Korea and Zambia, the countries fall into three groups: low, medium, and high output loss as a percent of GDP. Colombia, Ghana, Côte d'Ivoire and Pakistan lost, on average, less than one percent of GDP per year. At the other extreme, Mexico, Malawi, Chile, and Kenya, on average, lost close to four percent of GDP per year. In interpreting this result, one must remember that for unstable countries (Côte d'Ivoire, Mexico, Malawi, and Chile), the estimate of the output loss may be biased in an unpredictable direction because of a change in the value of $\hat{a}$ during the adjustment period.

In spite of these caveats, our results suggest a sizeable output loss because of lower aggregate investment levels during the period of adjustment under IMF-WB lending. Since an objective of these growth-oriented programs was to restore growth by, among others, raising investment, one must ask what causes this sharp decline in investment and resulting output loss. While our analysis does not allow us to measure by how much private investment actually fell, the estimated fall in aggregate investment output ratios was large enough in most countries to leave little doubt that private investment fell substantially during the adjustment. At least two factors must have contributed to the fall in private investment.

The first factor is that the expenditure-switching policies that accompanied the adjustment programs resulted in an increase in the relative price of imported capital goods. This cost increase was caused by the real exchange rate devaluation required to achieve a trade balance surplus to service the external debt. Furthermore, the interpretation of the statistical analysis of performance indicators in section 4 suggests that

scarce foreign exchange was probably tied up in purchasing intermediate goods with little left for capital goods imports.

But this interpretation does not recognize that, given capital investment partially irreversible because of sunken costs of entry and exit, the decision to invest in the activities supposedly made more profitable by the ongoing reforms depends on the probability of a policy reversal during the lifetime of the new investment. With costly resource reallocation, uncertainty is likely to have led many private investors to either keep their capital abroad or in existing activities until the subjective probability that the reforms and adjustment programs will not be reversed is high enough for them to commit to new investments. 10/ Thus, the second factor would ascribe much of the fall in private investment to the lack of credibility in the adjustment programs, perhaps mostly because of the size of the required adjustment, or perhaps also because of overambitious reforms in an unsettled macroeconomic environment.

6. Conclusions

This paper has provided a statistical analysis of performance under IMF-WB growth-oriented adjustment programs. The evaluation was based on a comparison of the average values of economic indicators during 1982-86 with the corresponding average values during 1978-81. The methodology controlled for the state of the external environment during the period when growth-oriented adjustment programs were in effect as well as for the initial conditions of the loan recipient countries. Account was also taken of the policies that would have been adopted had they not participated in IMF-WB adjustment programs.

Admittedly the methodology is crude, even though it controls for most of the pitfalls common in such comparative exercises. We found that initial conditions played a significant role in affecting macroeconomic performance. For example, we found that a higher current account surplus and a lower inflation during 1978-81 were associated with a better investment performance during 1982-86. We also found that a deterioration in the external environment during 1982-86 was associated with lower growth during that period.

The main result from our comparisons between IMF-WB recipients and countries that did not receive adjustment loans (or received them towards the end of the period so that not enough time had elapsed to include them among loan recipients) relate to growth and investment. After controlling for initial conditions and external factors, we found no evidence of a statistically better (or worse) performance for loan recipient countries. These results suggest that the expected positive effects on growth and resource mobilization expected from adjustment with growth packages and not yet occurred. Given that the structural reforms advocated by these programs often require a relatively long time period before their benefits materialize, these results may not be surprising.

In the last section of the paper we analyzed in greater detail the investment output relationship for a group of 14 countries that received a large amount of growth-oriented adjustment lending. For each country, we fit a simple production function (in which capital is the only constraint on growth) over a 25 year period. We then provided an estimate of the output loss from the shortfall in investment during the period when each country was receiving adjustment lending. The results show much foregone growth because of lower aggregate (public and private) investment levels

during the period of adjustment. Thus, the desired signs of a sustainable recovery through higher investment, evaluated here through 1986, were not evident.

Footnotes

1/ In previous work (Faini et. al. 1989), we evaluated performance under adjustment lending for a group of nine indicators using a before-and-after approach so that we did not control for initial conditions nor for the size of external shocks.

2/ The World Bank initiated SALS (structural adjustment loans) and SECALs (sectoral adjustment loans) in 1979 and 1981 respectively. Like the EFF (Extended Fund Facility) and stand-by arrangements, World Bank adjustment loans are quick disbursing loans. For a description of adjustment lending investments by the IMF (World Bank) see IMF (1987), World Bank (1989). All IMF upper credit tranche programs are of short duration and some Fund-supported adjustment programs were initiated before 1979. However, of 288 programs during 1973-86, only 44 took place during 1973-78.

3/ The following model draws on Goldstein and Montiel (1986).

4/ Because the choice of cut-off is arbitrary, we also carried out our estimation using 1981 as an alternative cut-off point. The results were similar to those reported in table 3.

5/ The formula derives from a two-period maximization by firms and households under assumptions of perfect competition and wage-price flexibility. See Dornbusch (1985, pp. 354-6).

6/ One round of exclusion tests results in about 5 percent loss of observations. Excluded countries are reported in the appendix in Table A.2. The exclusion criteria were determined by the value of Cook's D-statistic. See Belsley, Kuh and Welsch (1980), and section A.3.

7/ Similar results, not reported here, were obtained in an alternative estimation based on a model in which CON is replaced by the intensity of IMF-WB adjustment lending.

8/ Because we fit the growth model to a relatively large number of countries, we kept it as simple as possible so that we were not able to distinguish between capacity and productivity effects nor between private and public investment.

9/ The 14 countries (see Table 4) were selected on the basis of the number of SALs. Turkey, included in that sample, had to be dropped from our analysis because regime changes did not allow us to get stable estimates.

10/ This interpretation is emphasized in a broader context in the literature on credibility (Calvo, 1986; Dornbusch 1988; Rodrik, 1988).

References

Balassa, B. 1988. "Quantitative Appraisal of Adjustment Lending," PPR Working Paper Series No. 79.

Belsley, D. Kuh and Welsch. 1980. Diagnostic Tests in Regression Analysis.

Blejer, D. and M. Khan. 1984. "Government Policy and Private Investment in Developing Countries," IMF Staff Papers, 31, 2, 379-403.

Buffie, E. 1984. "The Macroeconomics of Trade Liberalization," Journal of International Economics, Vol. 17, pp. 121-37.

Buffie, E. 1986. "Devaluation, Investment and Growth in LDCs," Journal of Development Economics, Vol. 20, pp. 361-79.

Calvo, G. 1986. "Incredible Reforms," mimeo, University of Pennsylvania.

Cline, W.R. 1985. "International Debt: From Crisis to Recovery," American Economic Review, pp. 185-90.

Corbo, V., M. Goldstein, and M. Khan, eds. 1988. Adjustment with Growth, IMF, Washington, D.C.

Corden, M. 1988. "Macroeconomic Adjustment in Developing Countries," IMF (mimeo).

Cornia, G., R. Jolly, and F. Stewart. 1987. Adjustment with a Human Face, Vol. 1. Oxford University Press.

Dadkhah, K.M. and F. Zahedi. 1986. "Simultaneous Estimation of Production Functions and Capital Stocks for Developing Countries," The Review of Economics and Statistics, Vol. LXVIII, No. 3, pp. 443-51.

Dell, S. 1983. "Stabilization: The Political Economy of Overkill," in J. Williamson, ed., IMF Conditionality, pp. 7-46. Institute for International Economics, Washington, D.C.

Diaz-Alejandro, C. 1979. "Southern Cone Stabilization Problems," in W. Cline and S. Weintraub, eds., Economic Stabilization in Developing Countries, Washington, D.C.

Donovan, D.J. 1981. "Real Responses Associated with Exchange Rate Action in Selected Upper Credit Tranche Stabilization Programs," Staff Papers, pp. 698-727.

Dornbusch, R. 1985. "Policy and Performance Links Between LDC Debtors and Industrial Nations," Brookings Papers on Economic Activity, No. 2, pp. 303-68.

Dornbusch, R. 1986. "The Effects of OECD Macroeconomic Policies on Non-Oil Developing Countries," World Bank Staff Working Papers, No. 793, World Bank.

Dornbusch, R. 1988. "Notes on Credibility and Stabilization," mimeo, MIT.

Faini, R., J. de Melo, A. Senhadji-Semlali, J. Stanton. 1988. "Performance Under Adjustment Lending," forthcoming in V. Thomas, A. Chhibber, M. Dailami, and J. de Melo, eds., Structural Adjustment and the World Bank, Oxford University Press.

Genberg, A. and A.K. Swoboda. 1987. "The Medium-Term Relationship Between Performance Indicators and Policy: A Cross Section Approach," EPD Discussion Paper No. EPD-01, The World Bank.

Goldstein, M. and P. Montiel. 1986. "Evaluating Fund Stabilization Programs with Multicountry Data: Some Methodological Pitfalls," IMF Staff Papers, Vol. 33, No. 2, pp. 314-44.

Hausman, J.A. 1978. "Specification Tests in Econometrics," Econometrica, Vol. 46, pp. 1257-70.

Khan, M. 1988. "The Macroeconomic Effects of Fund-Supported Adjustment Programs: An Empirical Assessment," (mimeo), IMF.

Khan, M. and M. Knight. 1981. "Stabilization Programs in Developing Countries: A Formal Framework," Staff Papers, Vol. 28, No. 1, pp. 1-53.

Kiviet, J.F. 1985. "Model Selection Test Procedures in a Single Linear Equation of a Dynamic Simultaneous System and Their Effects in Small Samples," Journal of Econometrics, Vol. 28, 327-62.

Kiviet, J.F. 1986. "On the Rigour of Some Mispecification Tests for Modelling Dynamic Relationships," Review of Economic Studies, pp. 241-61.

Mitra, P.K. 1984. "Adjustment to External Shocks in Selected Semi-Industrial Countries, 1974-1981," mimeo, Public Economics Division, The World Bank.

Rodrik, D. 1988. "Liberalization, Sustainability, and the Design of Structural Adjustment Programs," mimeo, The World Bank.

Sachs, J. and H. Huizinga. 1987. "U.S. Commercial Banks and the Developing Country Debt Crisis," Brookings Papers on Economic Activity.

Sargan, J.D. 1958. "The Estimation of Economic Relationships Using Instrumental Variables," Econometrica, Vol. 26, pp. 393-415.

van Wijnbergen, S. 1982. "Stagflation Effects of Monetary Stabilization Policies: A Quantitative Analysis of South Korea," Journal of Development Economics, Vol. 10, pp. 133-69.

van Wijnbergen, S. 1986. "Exchange Rate Management and Stabilization Policies in Developing Countries," Journal of Development Economics, Vol. 23, pp. 227-47.

Appendix

1. Data Sources

All data were extracted from the World Bank's BESD and ANDREX data bases except the SAL and SECAL flows which were extracted from World Bank publications. Data in constant dollars were obtained by using the World Bank's atlas exchange rate conversion factor. In the calculation of external shocks (equation 4), terms of trade indices were obtained by dividing current exports and imports (expressed in dollars) by the constant values. Similar results were obtained when the terms-of-trade indices were calculated from current and constant local currency values from National Accounts data.

To calculate the effective interest rate on external debt, we applied LIBOR + 1 to the share of total non-concessional debt and the implicit interest rate from interest payments on concessional debt. For Bank-Funding (BF) we constructed two variables; one based on gross IMF credit (results in table 1); another in the net IMF credit where IMF credit was calculated as IMF purchases less IMF repurchases. In both cases, Bank SAL credits are the sum of SAL + SECAL commitments. We did not report the results based on the net IMF credit definition because they are extremely close to those obtained with gross credit.

As mentioned in the text, we also experimented with a formulation in which we replaced the dummy control group variable CON in equation (3) with a measure of the intensity of IMF-WB credit. In those regressions (not reported in the text because they were similar with those discussed in section 4), the measure of IMF-WB lending intensity is the average IMF + WB

credit (SAL + SECAL) during 1982-86, expressed as a percentage of average GDP during 1982-86.

2. Sample

Table A.1 lists the 93 countries in the sample along with their classification. The control group, denoted by C, includes 41 countries of which 6 countries received adjustment lending in 1986, the last year of available data and 3 which received their first adjustment credit in 1984. All other countries received IMF and/or World Bank adjustment credits between 1982 and 1984. Of the 50 countries which received adjustment credits during this period, 26 countries initiated their first adjustment credit in 1982 and 24 in 1983.

3. Excluded Countries from Table A.1

The control group is the group of countries that did not receive a loan either from the Bank or from the Fund in and after 1982. Exclusion criteria were based on the method outlined in Belsley, Kuh, and Welsch (1980, chap. 2). We tested only for influential observations, not for outliers. We performed one round of exclusions based on the following statistic:

$$(n - p) [h_i - (1/n)] / (1 - h_i) (p - 1) \sim F_{p-1,\, n-p}$$

where

n = number of observations

p = number of explanatory variables

h_i = i th diagonal element of the projection matrix.

Table A.1: 93 COUNTRIES IN SAMPLE

	Nation		Nation
(F,B)	Argentina	(F,B)	Morocco
C	Burundi	(F,B)	Madagascar
C	Benin	(F,B)	Mexico
F	Bangladesh	F	Mali
C	Bolivia	C	Malta
(F,B)	Brazil	C	Mauritania
F	Barbados	(F,B)	Mauritius
C	Burma	(F,B)	Malawi
C	Botswana	C	Malaysia
(F,B)	Central African Republic	(F,B)	Niger
(F,B)	Chile	B	Nigeria
C	China	C	Nicaragua
(F,B)	Côte d'Ivoire	C	Nepal
C	Cameroon	(F,B)	Pakistan
C	Congo	(F,B)	Panama
B	Colombia	F	Peru
(F,B)	Costa Rica	(F,B)	Philippines
C	Cyprus	C	Papua New Guinea
F	Dominican Republic	F	Portugal
C	Algeria	C	Paraguay
(F,B)	Ecuador	C	Rwanda
C	Egypt	(F,B)	Sudan
C	Ethiopia	(F,B)	Senegal
C	Fiji	C	Singapore
C	Gabon	(F,B)	Sierra Leone
(F,B)	Ghana	F	El Salvador
C	Guinea	(F,B)	Somalia
F	Gambia	C	Seychelles
B	Guinea-Bissau	C	Syria
C	Greece	C	Chad
F	Guatemala	(F,B)	Togo
C	Guyana	(F,B)	Thailand
C	Hong Kong	C	Trinidad and Tobago
F	Honduras	C	Tunisia
F	Haiti	(F,B)	Turkey
(F,B)	Hungary	C	Tanzania
C	Burkina Faso	(F,B)	Uganda
C	Indonesia	(F,B)	Uruguay
F	India	C	Venezuela
C	Israel	C	Yemen
(F,B)	Jamaica	C	Democratic Yemen
C	Jordan	(F,B)	Yugoslavia
(F,B)	Kenya	F	South Africa
(F,B)	Korea	(F,B)	Zaire
F	Liberia	(F,B)	Zambia
F	Sri Lanka	(F,B)	Zimbabwe
C	Lesotho		

Notes: F,B denote IMF and WB loan recipients respectively during the period 1982-84.

Table A.2: COUNTRIES EXCLUDED FROM PERFORMANCE REGRESSIONS

EQUATION	GDPK	GDIGDP	INF	CAGDP
LIST OF EXCLUDED COUNTRIES	Bolivia Burma Israel Turkey	Mali Sierra Leone	Lesotho Sierra Leone Tanzania	Paraguay Sierra Leone

For $p > 10$ and $n - p > 50$, the value of the F at 95% confidence level is less than 2 and hence 2 p/n is a good rough cut-off. We took into account two criteria: (a) no more than 5% of the observations should be excluded; and (b) exclude observations for which $h_i > 2\ p/n$.

Table A1 lists the 93 countries in the sample. Table A2 gives the list of influential observations excluded from each equation.

4. Production Function Estimation

Estimation of the production function relied on a strategy to detect the presence of correlation of Q_{t-1} with the error term and to check for endogeneity of I_t. An instrumental variable (IV) method, described below, was used if either Q_{t-1} or I_t were found to be endogenous.

Under the assumption that capital (K_t) is the only binding factor, output (Q_t) can be written as $Q_t = aK_t + u_t$ where u_t is a stochastic term. Lag the expression for Q_t by one period, multiply the resulting expression for Q_{t-1} by one minus the depreciation rate λ, then subtract $(1-\lambda)Q_{t-1}$ from Q_t. Using the capital stock identity yields equation 5 in the text. The model draws on Dadkhah and Zahedi (1986).

The error term in eq. 5 v_t is equal to $u_t-(1-\lambda)v_{t-1}$. Therefore, unless the error term u_t follows a first-order autoregressive process with parameter $\rho=1-\lambda$, OLS estimation will yield inconsistent estimates because of correlation of Q_{t-1} with the error term. The possible endogeneity of I_t in (5) may also result in inconsistent estimates. This led us to adopt the following estimation strategy.

First, we estimated (5) by OLS for the fourteen countries performing the Lagrange multiplier (LM) test for autocorrelation to check whether one can assume that $\rho=1-\lambda$. In the case of a significant value of

the LM test, an instrumental variable (IV) procedure was used with I_{t-1} and domestic credit as instruments for Q_{t-1}. In the case where endogeneity of I_{t-1} was detected alone with autocorrelation, we used I_{t-2} and domestic credit as instruments for Q_{t-1}. Table A.3 gives the precise set of instruments used in each equation estimated by IV. Finally, in checking for endogeneity of I_t, we used the Hausman (1978) test on OLS equations and the Sargan (1958) test on the instrumental variable equations.

To sum up, we used OLS if neither Q_{t-1} nor I_t were shown to be endogenous. An instrumental variables technique was used otherwise, with the set of instruments depending on which variable was detected endogenously, (Q_{t-1} and/or I_t), and on the eventual presence of autocorrelation.

To test for stability we used both the Chow and the Hendry procedures for OLS estimates, and we relied on the modified Chow test (Kiviet, 1985) in the context of IV estimation. In deciding whether an equation was stable or not, we allowed for the fact that the power of the Chow test may be fairly low, while the actual size of the Hendry test may exceed its nominal size by a very large factor (Kiviet, 1986).

Table A.3

Estimation Technique		LM (X^2_1)	Chow	Hendry	Sargan	Godfrey	Set of instruments
IV	Chile		13.6 (.02)		.28(X^2_1)	.008 (.93)	B
IV	Colombia		1.31 (.25)		1.09(X^2_1)	1.09 (.30)	A
OLS	Ghana	.08 (.78)	.08 (.30)	1.33 (.85)	1.35		
OLS	Jamaica	.02 (.89)	.02 (.54)	.74 (.82)	.94		
OLS	Côte d'Ivoire (fixed)	2.06 (.15)	2.06 (.01)	4.48 (.58)	5.67		
OLS	Kenya	.18 (.67)	.18 (.78)	.49 (.64)	3.36		
OLS	Korea (1)	9.51 (.002)	9.51 (.13)	1.98 (.57)	4.80		
OLS	Malawi	.48 (.49)	.48 (.05)	2.69 (.80)	3.08		
IV	Mexico		17.18 (.004)		2.24(X^2_1)	2.24 (.13)	D
IV	Morocco		7.3 (12.2)		4.03(X^2_1)	4.03 (.04)	C
OLS	Pakistan	1.69 (.19)	1.69 (.23)	1.51 (.89)	2.90		
IV	Philippines		19.2 (.01)		.0(X^2_1)	.0 (.99)	A
OLS	Thailand	1.39 (.24)	1.39 (.54)	.84 (.92)	1.42		
OLS	Zambia	2.24 (.09)	2.24 (.99)	.11 (1.0)	.11		

A: I, I(-1), DC
B: I, I(-1), Q(-2)
C: I(-1), DC, Q(-2)
D: I(-1), DC, DC(-1), Q(-2)

For the definition of the variables see section A.4.

(1) The LM is quite high for Korea which indicates the presence of autocorrelation. Normally, the IV technique would have been employed but did not give reasonable estimate. Hence, OLS estimates are reported.

Significance level for chi-squared statistic:

$X^2_{1,\alpha = .05} = 3.84$ $\quad X^2_{1,\alpha = .01} = 6.63$

$X^2_{2,\alpha = .05} = 5.99$ $\quad X^2_{2,\alpha = .01} = 9.21$

PRE Working Paper Series

	Title	Author	Date	Contact for paper
WPS402	The GATT as International Discipline Over Trade Restrictions: A Public Choice Approach	J. Michael Finger	March 1990	N. Artis 38010
WPS403	Innovative Agricultural Extension for Women: A Case Study of Cameroon	S. Tjip Walker	June 1990	M. Villar 33752
WPS404	Chile's Labor Markets in an Era of Adjustment	Luis A. Riveros	April 1990	R. Luz 34303
WPS405	Investments in Solid Waste Management: Opportunities for Environmental Improvement	Carl Bartone Janis Bernstein Frederick Wright	April 1990	S. Cumine 33735
WPS406	Township, Village, and Private Industry in China's Economic Reform	William Byrd Alan Gelb	April 1990	K. Chen 38966
WPS407	Public Enterprise Reform: A Challenge for the World Bank	Ahmed Galal	April 1990	G. Orraca-Tetteh 37646
WPS408	Methodological Issues in Evaluating Debt-Reducing Deals	Stijn Claessens Ishac Diwan	May 1990	S. King-Watson 33730
WPS409	Financial Policy and Corporate Investment in Imperfect Capital Markets: The Case of Korea	Mansoor Dailami	April 1990	M. Raggambi 37657
WPS410	The Cost of Capital and Investment in Developing Countries	Alan Auerbach	April 1990	A. Bhalla 37699
WPS411	Institutional Dimensions of Poverty Reduction	Lawrence F. Salmen	May 1990	E. Madrona 37496
WPS412	Exchange Rate Policy in Developing Countries	W. Max Corden	May 1990	M. Corden 39175
WPS413	Supporting Safe Motherhood: A Review of Financial Trends Full Report	L. M. Howard	May 1990	S. Ainsworth 31091
WPS414	Supporting Safe Motherhood: A Review of Financial Trends Summary	L. M. Howard	May 1990	S. Ainsworth 31091
WPS415	How Good (or Bad) are Country Projections?	Norman Hicks Michel Vaugeois	April 1990	M. Berg 31058

PRE Working Paper Series

	Title	Author	Date	Contact for paper
WPS416	Improving Data on Poverty in the Third World: The World Bank's Living Standards Measurement Study	Paul Glewwe	May 1990	A. Murphy 33750
WPS417	Modeling the Macroeconomic Requirements of Policy Reform	William Easterly E. C. Hwa Piyabha Kongsamut Jan Zizek	May 1990	R. Luz 34303
WPS418	Does Devaluation Hurt Private Investment? The Indonesian Case	Ajay Chhibber Nemat Shafik	May 1990	M. Colinet 33490
WPS419	The Design and Sequencing of Trade and Investment Policy Reform: An Institutional Analysis	Brian Levy	May 1990	B. Levy 37488
WPS420	Making Bank Irrigation Investments More Sustainable	Gerald T. O'Mara	May 1990	C. Spooner 30464
WPS421	Taxation of Financial Intermediation: Measurement Principles and Application to Five African Countries	Christophe Chamley Patrick Honohan	May 1990	W. Pitayato-nakarn 37666
WPS422	Civil Service Reform and the World Bank	Barbara Nunberg John Nellis	May 1990	R. Malcolm 37495
WPS423	Relative Price Changes and the Growth of the Public Sector	M. Shahbaz Khan	May 1990	WDR Office 31393
WPS424	Mexico's External Debt Restructuring in 1989-90	Sweder van Wijnbergen	June 1990	M. Stroude 38831
WPS425	The Earmarking of Government Revenues in Colombia	William A. McCleary Evamaria Uribe Tobon		
WPS426	Growth-Oriented Adjustment Programs: A Statistical Analysis	Riccardo Faini Jaime de Melo Abdel Senhadji-Semlali Julie Stanton	June 1990	M. Ameal 37947
WPS427	Exchange Reform, Parallel Markets and Inflation in Africa: The Case of Ghana	Ajay Chhibber Nemat Shafik	May 1990	M. Colinet 33490
WPS428	Perestroyka and Its Implications for European Socialist Countries	Bela Balassa	May 1990	N. Campbell 33769